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Video Game Play and Lucid Dreams: Implications for the Development of Consciousness

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Abstract

The improvement of various cognitive skills associated with video game play has been well documented however the development of consciousness implications have not been considered. In the present study several potential indicators of consciousness development, including and especially lucid dreaming frequency, were examined as a function of video game play. In the first study high video game players were more likely to report lucid dreams, observer dreams, and dream control when dream recall frequency and motion disorientation during play were controlled. There were no similar differences in other consciousness development indices. In the second study, a slightly different pattern of results occurred due respondents all being frequent players.

Key words: dreams, video games, consciousness, lucid dreams, mystical

Video Game Play and Lucid Dreams: Implications for the Development of Consciousness

Psychologists have theorized that qualitative changes in cognition do not stop at the abstract verbal level, but development continues to higher stages (Hunt, 1995). These nonverbal or nonlinear levels are thought to be characterized by spatial thinking, multimodal speeding of processing, and the integration of self and affect with cognition. Thus this developmental sequence is described in terms of consciousness and not just cognition in order to capture the breadth of the phenomena. Theorists suggest that exposure to appropriate amplifiers is necessary to move to the next higher level of consciousness (Alexander, Davies, Dixon, Dillbeck, Ortzel, Muehlman, & Orme-Johnson., 1990). In the past these amplifiers have included meditation and prayer, recall of dreams and self-reflection among others. In this study it is suggested that video game play may be another such amplifier.

In previous research, Gackenbach (1991) argued that a naturally occurring "virtual" reality (i.e., lucid dreaming) is a bridge to the experience of higher states of consciousness. Lucid dreaming, that is, awareness of dreaming while still in the dream state, is one of many preliminary indicators of the development of higher states of consciousness.

It has been pointed out by Blackmore (2003) that based on the cognitive science (mental model) understanding of our sense of self in the world; our perception of reality is a construction, a best guess. Lucid dreaming is another such construction with a different set of input variables than those experienced while awake. Virtual reality (VR) potentially offers practice in maneuvering around in, as well as being in, "artificial" or perhaps "alternative" realities. The felt sense of VR's perceived reality is termed in the VR literature as telepresence. Witmer and Singer (1998) found that high presence in VR occurred with increases in involvement, control, selective

attention, perceptual fidelity and mimicking real world experiences. All are increasingly present in video games. It's been suggested by Preston (1998/in press) that a parallel construct for the sense of VR presence for waking reality might be psychological absorption.

The specific hypothesis in the present study is that extensive VR practice would translate into more accurate state recognition in dreams (i.e., an increase in lucid dreams). One of the areas where we see such extensive practice in VR is in video game playing which is hypothesized as being associated with an increase in lucid dreaming frequency, controlling dreams and observing dreams with the last two frequently associated with lucidity in dreams. Thus rather than consider the content of dreams as a function of exposure to video games, which is a classic media effects question, this study examines the form of dreaming as a function of video game play.

Video Game Play and Cognitive Variables

There are other lines of evidence which further support this hypothesis such as research on the relationship between performance on such games and various cognitive variables. The major work in the area is concludes that video game play increases choice reaction time performance, spatial skills, scientific problem solving skills, and intelligence (Greenfield & Cocking, 1996). Henderson (2005) has summarized subsequent research into the cognitive advantages of video game play and lists these as having been demonstrated: spatial relations ability; spatial visualization; perceptual speed; scientific problem solving skills; intelligence; ability to reason inductively and deductively; ability to reason metacognitively and reflective decision making.

Video Game Play and Consciousness

An elemental aspect of consciousness is attention. Green and Baveller (2003) found that habitual electronic game players experience improved visual attention. Visual attention needs to be divided in order to play video games and Subrahmanyam, Greenfield, Kraut, and Gross, (2001) reported that skilled video game players had “better developed attentional skills than less skilled players” (p. 15). Maynard, Subrahmanyam and Greenfield (2005) reviewed the attention and video game play literature. They found that experimental manipulations with attention as the dependent variable resulted in improved attention among those assigned to the video game playing condition. But the type of game can affect the outcome. One study finding was that a battle game was better at improving attention than Tetris, a puzzle game.

Another variable related to consciousness development is psychological absorption. Psychological absorption in gaming has been examined by Glicksohn and Avnon (1997), who found that some of their subjects reported experiences during video game play indicative of altered states of consciousness² (e.g., drifting, flying or changes in visual or auditory perception). These subjects also showed significant increases in absorption associated with video game play relative to subjects who did not report such consciousness alterations during video game play. Furthermore, Wood, Griffiths, Chappell, and Davies (2004) found that rapid absorption into games was rated as highly important by gamers. As noted Preston (1998/in press) reviewed the research on absorption and VR immersion, which is most commonly experienced in video game play, concluding that those that score high on psychological absorption:

evaluate information in a distinct way that links it to self. This strongly implies that, regarding vision, audition, touch and balance, information to more modalities increases absorption. Multimodal stimulation creates a greater sense of presence in immersive VR.

Immersive VR has the potential to offer low absorbers access to altered states of consciousness like those which high absorbers experience and also has the potential to offer to us all access to a higher level of consciousness.

Other elements of consciousness have been reported as a result of video game play. For instance, Voiskounsky, Mitina, and Avetisova (2004), Chou and Ting (2003) and Choi and Kim (2004) note a relationship between video game play and the experience of “flow” as conceptualized by Csikszentmihalyi (1990) which in turn can be conceptualized as related to psychological absorption. Chou and Ting (2003) examined self reports of flow on a scale they developed. Using the same scale Gackenbach and Reiter (2005) found in preliminary analysis that frequent game players reported more flow experiences while playing video games than infrequent players.

Previous Research into Video Game Play and Dreams

Despite the immense popularity of video games, there has been very little research examining the effects of video game play on dreams. Players of the puzzle type game called Tetris reported intrusive, stereotypical, visual images of the game at sleep onset (Stickgold, Malia, Maguire, Roddenberry, & O'Connor, 2000) and psychiatrists Bertolini and Nissim (2002) recognize fragments or characters from the video games in the material of children’s dreams. They concluded that due to this radical change in children’s play patterns they must now incorporate video games into their child therapy practice.

Relevant to the current inquiry is earlier work by Gackenbach and Preston (1998) and Preston and Nery (personal communication October 25, 2004) on the exact question of this study regarding the relationship between video game play and the development of consciousness as

expressed in lucid dreaming frequency, among other things. These two research studies will be discussed in more detail.

In a convenience sampling technique, Gackenbach and Preston (1998) posted a questionnaire to various usenet groups primarily focusing on video game play and sent it to former students and colleagues. The questionnaire gathered information about video game habits and preferences and consciousness (including dreams) habits and experiences. Various factor analysis found some relationships between the indicators of consciousness (including lucid dreams) and the video game playing questions. In some cases the factors showed a negative relationship (high video game play and low consciousness development indices) between the two groups of variables while other factors showed a positive relationship (high video game play and high consciousness development indices). The inconclusiveness of this study might have been an indication of the limits of the technology, three dimensional play (i.e., therefore higher VR presence) had not been introduced, and that players may not have started as young or played as long as seems to be the case today.

Some years later Preston and Nery (personal communication, October 25, 2004) examined several measures thought to be related to video game play skill as well as several related to the development of consciousness. They found, as with the first study, several factors which loaded a combination of the video game playing variables with the development of consciousness variables but again there were equivocal results.

Subrahmanyam et al (2001) point out that most studies on attention and other related cognitive variables measure short term effects while few look at the long term implications which is the focus of the present studies. They further note that, "Computer hardware and software evolve so quickly that most of the published research on the cognitive impact of game

playing has been done with the older generation of arcade games and game systems (p. 13).”

Thus marginal affects with less sophisticated systems may show larger and more long term effects as the apparatus improves. This caveat is important to note in reporting the relationship of video game play to dream forms.

Based upon the previous two studies just reviewed showing some relationship between experiences thought to be indicative of consciousness development, these two studies replicate and extend the previous work by Gackenbach and Preston (1998) and Preston and Nery (personal communication October 25, 2004). A short form of a survey was administered in classes (Study 1) at a Canadian college and a long form of the same survey was placed online (Study 2) and thus was internationally accessible. It is hypothesized that there will be a positive relationship between video game play and indicates of the development of consciousness, especially lucid dreaming frequency.

STUDY 1: IN-CLASS DATA COLLECTION

Method

The data was collected from 377 students using the classroom performance system (i.e., remote controls which register each student’s response in an electronic data base) in 15 groups ranging in size from 10 to 40 students. The data was collected from November 19th to the 26th of 2004 at a college in western Canada. Participants were asked their video game playing history, dream experiences and selected questions from the self-transcendence subscale of the Temperment and Character Inventory which assessed mystical experience and absorption (Cloninger, 2004). The dream questions were posed in terms of frequency while the mystical and absorption items were posed in terms of relative agreement. All but 12 of these college students were tested in their sociology and psychology classes.

It was hypothesized that frequent video game play would be associated with high lucid, observer and control dreaming, and high scores on the mystical and absorption items from the self-transcendence subscale of the Temperment and Character Inventory.

Results

The short form of the questionnaire had 377 respondents, of which 119 were male, 234 were female and 24 did not indicate their gender. Forty percent were 19 years of age or younger while another 47.7% were 20 to 25 years of age.

A principle component analysis with a varimax rotation factor analysis was calculated on all variables except sex and age. Unlike the earlier studies (Gackenbach & Preston, 1998; Preston & Nery, personal communication October 25, 2004), none of the consciousness variables loaded on factors with the video game variables. In fact the conceptual clusters were quite clean. That is to say that they each loaded on separate factors: 6 mystical questions on factor 1; four video game questions on factor 2; three motion sickness questions on factor 3; three absorption questions on factor 4; three of the four dream questions (recall, lucid and control) on factor 5; and the dream observer question on factor 6³.

Because of these conceptual distinctions, video game player groups were identified by four video game questions; frequency of play, length of play, age begun playing (younger start given higher score), and number of types of games played. Scores on these four variables were converted to z-scores and summed. These video game history sum scores were split into three groups of players; high, medium and low/no history video game play behaviors.

Two variables were thought to be potential confounds when assessing the relationship between video game play and dream incidence; dream recall frequency and motion sickness experiences when playing video games. One-way analyses of variance on these two variables

did show group effects (dream recall $F(2,327)= 2.977$, $p = .052$; motion sickness sum $F(2, 312)= 4.895$; $p = .008$). High video game players showed less motion sickness and less dream recall than moderate or low video game players. Vestibular integrity and high dream recall have been shown in previous research (Gackenbach, Snyder, Rokes & Sachau, 1986; Snyder & Gackenbach, 1988) to be associated with lucid dreaming.

Therefore motion sickness sum and dream recall frequency were the two covariates on the subsequent analysis of covariance (ANCOVA). The ANCOVA were calculated between the three video game playing groups on three dream variables (lucid dreams, observer dreams, control dreams). All three ANCOVA's were found to be significant: Lucid dreaming $F(4,299)=7.857$, $p<.0001$; Observing dreaming $F(4,299)=3.39$, $p=.010$; control dreaming $F(4,299)=3.610$, $p=.007$. The high video game players had more lucid dreams and more control dreams than the other two groups, but for the observer dreams, it was the medium video game playing group which had fewer than the other two groups, which had about the same. See means and standard deviations in Table 1.

Insert Table 1 About Here

Table 1:

Descriptive Statistics on Dream Variables as a Function of Video Play Group

	Video Game Groups	Mean	Standard Deviation	N
Lucid	Low Video Game Play	2.46	.768	107
Dreaming	Medium Video Game Play	2.54	.804	92
	High Video Game Play	2.69	.967	101
Observer	Low Video Game Play	2.42	.836	107
Dreaming	Medium Video Game Play	2.23	.743	92
	High Video Game Play	2.42	1.013	101
Control	Low Video Game Play	2.21	.887	107
Dreaming	Medium Video Game Play	2.29	.819	92
	High Video Game Play	2.46	1.025	101

Due to Hunt's (1995) connection of the vestibular system and spatial skills to the mystical experience, the next set of analysis controlled for motion sickness. This ANCOVA was done on the sum scores of the mystical items and sum scores of the absorption items. The former, but not the latter were significant; mystical $F(3,280)=3.8, p=.011$; absorption $F(3,280)=.733, ns$. Mystical scores were highest for the low video game group and lowest for the medium video game group, with the high video game group falling in the middle. Due to the significant effect of the sum score of the mystical items, separate ANCOVA's were calculated for each mystical item on the video game groups, with motion sickness as the covariate. Four of the six items were significant or approached conventional levels of significance. The basic thrust of these analyses is that the low video game play group scored higher on these items, with the high video game group falling next⁴.

Finally, when considering the findings regarding mystical experiences questions, one must keep in mind that the absolute values of the students responses fell between disagree and neutral; so it isn't that some of these students are having more mystical experiences than others, but rather some disagree less with these questions. A 3(video game group) X 2(mystical mean/absorption mean) ANOVA was calculated on the two subscale means for these types of questions. There was no main effect or interaction for the video game group but there was a main effect ($F(1,289)=97.983, p<.0001$) for mystical versus absorption item means, such that all students moved from a disagree/neutral position on the mystical (mean=2.75; sd=.66) to a neutral/agree position on the absorption items (mean=3.32; sd=.85).⁵

From these analyses one can conclude that there is an association between video game play and some indices of consciousness development, especially dream forms. Although one can not assume causality, it may be that as young adults play video games, it is affecting their dreams

in terms of metacognitive processes which have been identified elsewhere as potentially transpersonal. Alternatively, the wording of the mystical items may show different results if worded in a manner compatible with the video game play environment. To further explore these provocative relationships, a longer version of the questionnaire administered in class was posted online.

STUDY 2: ONLINE DATA COLLECTION

Method

Links to the research questionnaire were listed on a few video game web sites and with “Psychological Research on the Net”. In terms of the last, it was listed on Nov. 29, 2004 and removed on May 30, 2005. Several hundred psychology experiments are listed at this site under a variety of headings. Visits to the video game research questionnaire front page numbered 1193 during this time period, and of those 351 completed the rather lengthy questionnaire.

This questionnaire asked for various pieces of demographic information, such as sex, age and education. The next section covered video game habits and experiences: frequency of playing games in terms of number of days, length of typical session, length of last session, number of different video game formats played, age when played first game, age when peak playing occurred, who play with. This was then followed by a list of video game types and the respondent was asked to indicate the frequency with which they played each: action, adventure, arcade, role playing, strategy, simulation, driving, puzzle, sport and violent. The section closed with several questions regarding symptoms of apparent motion during video game play: nausea,

stomach awareness, increased salivation, eyestrain, difficulty focusing, blurred vision, headache, dizziness, and vertigo.

The third section of the online questionnaire dealt with frequency of various dream/sleep experiences: dream recall, lucid dreams, observer dreams, control dreams, nightmares, night terrors, archetypal dreams, and REM paralysis. Each was briefly defined in the question. Part 4 of the questionnaire dealt with states of consciousness habits and experiences. Participants were asked to indicate their frequency of experiences with prayer, meditation, out of body experiences, precognitive experiences, and mystical experiences. Again each was briefly defined in the item.

Finally, a scale called the Personality Aspect Questionnaire was included, which in fact was selected items from the Self-Transcendence subscale of the TCI (Temperment and Character Inventory; Cloninger, 2004). These 20 items included the nine used in Study 1. In this case the items were worded and the response choices were given in terms of frequency and not agreement.

As there was additional video game play information on this questionnaire the video game groups were defined by the same four variables identified in the previous study (frequency of play, length of typical play session, age begun play with high scores given to younger starts, and number of types of games played) plus length of last video game played, age of peak frequency of video game play (younger ages scored higher), and sum score of frequency of playing nine different types of video games. As with the previous study the video game playing variables were first converted to z scores and then added. This score was then split into thirds, creating low, medium and high video game playing groups.

Results

Analyses of covariance were calculated on dream variables (lucid dreaming, observer dreams, control dreams, nightmares, night terrors, archetypal dreams, REM paralysis dreams), waking variables (out-of-body experiences, precognitive experiences, mystical experiences), mystical and absorption variables (11 items were added to the nine included in the in-class survey). Additional information was gathered about whether participants prayed or meditated or had an interest in these. ANOVA on these last two variables resulted in a significant difference between groups on meditation ($F(2,262)=2.9, p=.057$) where the high video game group reported more experience with and interest in meditation than the other two groups. Previous research has shown that this can be a confound in estimating lucid dreaming frequency as well as mystical experiences (Snyder & Gackenbach, 1988). Therefore meditation was an additional covariate in subsequent analyses of all variables. One way ANOVA's on apparent motion sum scores and on dream recall showed no video game group differences. Nonetheless, because of previous various earlier findings these variables were also included as covariates.

Thus the covariates on the dream variables were dream recall, motion sickness and meditation while the covariates on all other analyses were motion sickness and meditation. Motion sickness for this group was a sum score of nine symptoms (nausea, stomach awareness, increased salivation, eyestrain, difficulty focusing, blurred vision, headache, dizziness, vertigo) of apparent motion reported as occurring during video game play.

The dream variable analyses included additional dream questions. Of the seven dream variables in the ANCOVA only two approached conventional levels of significance, nightmares ($F(5,245)=2.119, p=.064$) and night terrors ($F(5,245)=1.907, p=.094$). In both cases the high video game players reported fewer than the other two groups. Unlike the in-class data there was no difference in lucid, observer, or control dreams between video game playing groups, nor for

the other two added dream variables, archetypal dreams and REM paralysis. The waking experiences (i.e., out-of-body experiences etc.) ANCOVA's, with motion sickness and meditation as covariates, resulted in no significant difference between video game playing groups. Similar to the dream and waking analysis there were no differences between video game play groups on the mystical items nor the absorption items nor on a total scale score which was all those 9 items plus 11 others.

Given this general lack of results on variables similar to the in-class data collection, a ceiling effect for the video game playing groups was suspected. Specifically it could be that the online groups consisted of more frequent players than the in-class groups. This was suspected in part because the in-class groups were largely female and historically they do not play video games as often as men. Secondly, those who self selected online to participate in this research would likely be more interested in video game play than those who did not participate given the wide range of choices on the psychology experiments website.

Merging Data to Examine Ceiling Effects

In order to compare these two sets of data for a potential ceiling effect, some of the variables had to be dropped from the longer online form and some adjustments had to be made. In general, information gathered online was considerably more detailed than that gathered in-class. In part this was due to the limited time and the 5 response limit of the CPS system which was used to gather the in-class data. Once these conversions were made a chi-square was calculated on video game groups (defined the same way as in Study 1 for the In-Class data collection) as a function of data collection group. The suspected ceiling effect was confirmed. The 3 (high, medium, and low video game players) by 2 (in-class and on-line data collection) chi square analysis was significant ($\chi^2(2)=125.657, p<.0001$). Table 2 shows the distribution.

Insert Table 2 about here

Table 2: Video Game Play Group as a Function of Data Collection Method

Level of Video Game Play	Data Collection		Total
	In-class	On-line	
Low Video Game Players	182	31	213
Medium Video Game Players	100	113	213
High Video Game Players	72	143	215
Total	354	287	641

More participants who fell into the high video game playing group came from online while more people that fell into the low video game play group were in the classroom. This is not really surprising given the passion of video game players, one would expect when faced with a range of types of psychology experiments to participate in, they would choose one on video games. On the other hand, data collection in-class accessed a wider range of people's experiences with video games. Although this classification was based on z-scores which were then summed on the four video game play variables, a look at frequencies as a function of sample tells the tale as well. This explains in part the lack of dream differences among the online participants (see Table 3).

Insert Table 3 about here

Table 3: Specific Video Game Variables as a Function of Data Collection Method

Video Game Variables*	Group	N	Mean	Std. Deviation
Frequency of Play*	In class	365	2.24	1.435
	Online	321	3.88	1.164
Length of Session*	In class	372	1.45	1.126
	Online	316	2.43	1.368
Number of Games Played*	In class	365	3.10	1.130
	Online	315	3.63	1.186
First Played Video Games	In class	377	2.07	.974
	Online	289	2.02	.595

*Significantly different

Given that the in-class data was based on many more women than men, gender differences were also examined. When a chi-square was calculated for sex by video game group, the results were significant ($\chi^2(2)=182.941, p<.0001$). As expected, based on the gender distribution as a function of data collection method, females tended to be in the lower video game playing groups while males were more likely to be in the higher. But when t-tests were calculated on sex for the dream, mystical and absorption variables, only one showed a sex difference; mystical sum ($t(569)=-5.084, p<.0001$). Not surprisingly women were less likely to disagree with these items than men. Therefore to control for the potential confound of gender, it was entered into some of the subsequent analyses as a covariate⁶.

Factor Analyses

A factor analysis was calculated examining type of game (see Appendix 3 online for more detail on game type analyses) and various dream and transpersonal variables. Of the eleven components that emerged, only 2 did not load game type with dream or transpersonal variables. The first factor loaded all the games but sports and violent with a lack of having out of body experiences. The second factor was violent video game play associated with prayer, precognitive waking experiences, sum of the mystical items, sum of the absorption items and sum of the personality aspect questionnaire. The third and fourth factors were either strictly game or strictly dream/transpersonal factors. The fifth factor loaded driving games, absorption and not prayer. For the first time dreams and games emerged together on factor six; observer dreams, nightmares and the lack of archetypal dreams were associated with playing arcade and puzzle games but not playing action games. In general this factor analysis failed to show any clear patterns of association between game type preferences and the transpersonal variables of interest⁷.

Violent Video Games

Of particular concern for the media are the effects of violent video game play. As noted, there were no video game group differences in the playing violent video games category however as noted in the beginning of this results section the high video game players from online had fewer nightmares or night terrors than the other two groups despite playing the same number of violent video games.

Another way to conceptualize video game players is to examine video game players who play violent games versus those who do not play violent games on nightmare type variables. No such relationship was found. Thus there is no evidence among these online game respondents that video game players that play violent games have more nightmares, night terrors or REM paralysis experiences. Additional t-tests were calculated on hi/lo violent video game players on the other variables. Only three of the total 25 tests were significant. Violent video game players played fewer games overall ($t(309)=2.489, p=.013$) and violent video game players had higher mysticism scores than the ones who do not play them as much ($t(249)=-2.387, p=.018$). The same result occurred with the sum score for the entire personality aspect questionnaire from which the mystical items were culled ($t(208)=-2.094, p=.037$). Although there are few differences in this set of analyses, by chance alone one would expect only one to be significant⁸.

Discussion

In the present study it was hypothesized that various indicators of the development of consciousness would show a relationship to video game play. This hypothesis was generated because of previous research on this question as well as other research on video game play and spatial skills, attention, absorption, and flow. Two self-report studies were reported upon herein. The first asked a few questions about video game play and consciousness development in

classrooms using an electronic data collection device while the second study asked the same and related questions in more detail online.

The in-class questionnaire data analysis video game groups were identified and compared on various transpersonal variables with appropriate covariates. The three dream variables showed differences in the expected direction; that is, there were more lucid dreams, more dream control, and more observing dreams for the high video game players group. This is illustrated with these quotes from video game players at the same college (McLean, 2005):

- "I don't always remember my dreams when I wake up... When I do, though, they're extremely lucid."
- "I've had lots of dreams where I've seen it in first and third person, ... It's like, 'Oh, wow, now I'm a player in Halo.'"

However, results on the other transpersonal variables, mystical experiences and psychological absorption, did not support the hypothesis. Specifically, the low video game play group reported higher scores on the mystical scale, while there were no group differences on absorption. A couple of things need to be considered regarding these two scales. First, the higher scores on the mystical scale were indicative of less disagreement with the items, rather than agreement with the items regarding mystical experiences. It may be that the mystical scores would change were the items worded in terms of video game play, as illustrated by this quote from a game player at the same school, "You almost zone out, ... Your mind just goes on autopilot and you just become one with the system ... Sometimes, you can't believe the moves you're making" (McLean, 2005). Second, the absorption items were items culled from the same scale, and were all rated higher than the mystical items. So despite the lack of group differences,

these students were more favorably disposed to agree with items that tap psychological absorption and appear to not have the “mystical” overtones in the wording.

Following the in-class data collection, a longer version of the questionnaire was posted to various web sites for 6 months. In order to follow the procedure set up in the first set of analyses, video game groups were again formed using the various video game measures. This included a few more than those available in class. The video game ANCOVA's used the same covariates as the first study, with the addition of interest in, and experience with meditation, which showed video game group differences. The three dream variables used in study 1 showed no group differences, but there were marginal group differences on two negative dream experiences (nightmares and night terrors) such that the high video game playing group reported fewer. This information was not available in the first study.

Anderson and Dill (2000) concluded in a review of the literature that violent video games will increase aggressive behavior in both the short term (e.g., laboratory aggression) and the long term (e.g., delinquency). However these effects can be mediated by self selection factors like personality. Bolton and Fouts (2005) found that

Higher levels of empathy were significantly correlated with the avoidance of killing innocents, i.e., a non-aggressive style of play. Higher levels of novelty sensation seeking were positively correlated to different aspects of aggressive play style; intensity sensation seeking was negatively associated. Contrary to expectation, higher levels of aggression were not consistently related to aggressive play.

Situational factors like poverty (Males, 1994) and self-reflection (Bittanti, 2005) may also mediate these effects. Stalder (2005) argues that

the individual player's fascination of death and violence is formed by a combination of cultural and social experience, media biography, gaming experiences, psychological distinctions, and biology/genetic disposition.

One of the oft cited results of frequent video game play is an increased insensitivity to violence (Anderson & Dill, 2000) which reasonably might generalize to a lack of concern in the face of violence in a dream as seems to be indicated by the results of the present inquiry. This must however be tempered with the caution that this data is correlational and thus assuming that these effects are causal due to video game play is wrong. Only an association can be noted. But in this case given the hugh research on the question it is a reasonable assumption to conclude that video game play may result in insensitivity to violence and thus when it appears in dreams a lack of labeling it frightening. Furthermore when this online data was split in terms of high and low violent video game players, among an entire sample who are frequent players, then no group differences in nightmares, night terrors or REM paralysis experiences emerged. This further supports the idea that video game play is not creating nightmares for those who play them.

The other transpersonal variables also showed no group differences. Given this general lack of results on variables similar to the in-class data collection, a ceiling effect for the video game playing groups was suspected and subsequently demonstrated. In other words, the online respondents were all high video game players relative to the in-class respondents thus group differences would not be expected.

Additional analyses were done for the online data examining type of video game played and the various transpersonal variables. Most of the factors in this factor analysis showed some mixture of game types played with transpersonal variables. Sadly this did not offer much illumination regarding the question of whether one type of game is more relevant to the

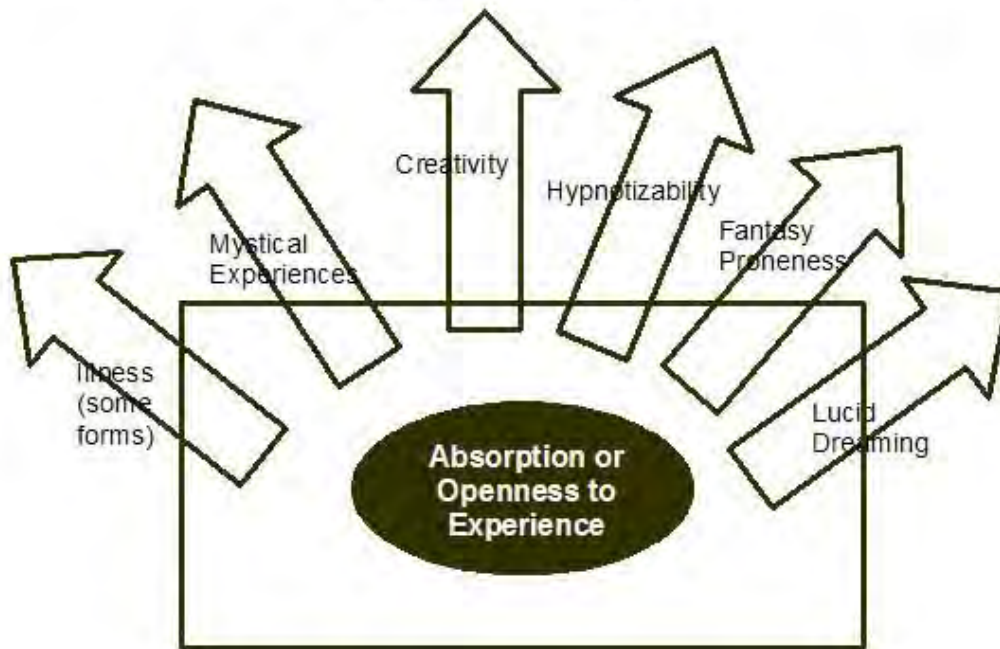
development of consciousness than others due to the highly varied results. It could be that this classification of games, although consistent with the marketing conceptualizations, does not fit with the social science thinking on the characteristics of games that make them compelling (Gee, 2003; 2005).

Future research into this subject should examine game player types in another form like along the variables suggested by Gee (2005). Also more detail about the dreams and experiences these players are having should be examined from a qualitative perspective. Also the mystical items should be reworded to reflect the video game environment and thus perhaps capture the nature of the experience.

To conclude, although there does seem to be some relationship between selected transpersonal variables thought to be indicative of the development of consciousness (Hunt, 1995) and video game play, the exact nature of this relationship remains to be teased out. It is perhaps as much of a mistake to lump puzzle game players in with first person shooter game players as it is to lump lucid dreams in with mystical experiences. Hunt (personal communication, June 13, 2005) has suggested that the emergence of these attributes thought important to the transpersonal perspective might all correlate at lower levels, but at the higher levels break out. This is shown in Figure 1.

Insert Figure 1 about here

Figure 1:
Gackenbach's Interpretation of Hunt's Separate Paths of Development of
Consciousness Model



All correlate at lower levels but then break out as separate skills, experiences or states of being at higher levels.

He argues that absorption or openness to experience are the central experience from which experiences found to be connected to the development of consciousness emerge. In other words, correlations may be confusing, or simply lump together to some degree at the lower levels of consciousness development along any of these lines. They might only emerge as unique factors at the higher levels. Others have viewed these transpersonal variables in a more hierarchical perspective with, for instance, lucid dreams preceding the mystical states (Gackenbach, 1991; Gackenbach & Bosveld, 1989). In either conceptualization, parallel lines of development or hierarchical development, various amplifiers can bring out those attributes associated with the transpersonal perspective or the development of consciousness. Ones most often examined include meditation, but also the use of drugs, dream recall, enhanced self awareness, flow experiences, and now perhaps video game play. It may be that another way the technological matrix will interact in deeply profound ways with the wet brain matrix, will be in the wiring of neural networks to create new and unknown outcomes. The bottom line is that children through young adults are highly involved in video game play and it is thus incumbent upon us to be more sensitive to what video game play is doing to the development of consciousness.

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Footnotes

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² Although aspects of altered states of consciousness are reported in the development of higher states of consciousness they should not be considered equivalent but rather related.

³ The table of this factor analysis is available in Table 1 online.

⁴ Descriptive statistics on the mystical items and on the sum score are displayed in Table 2 online.

⁵ Absorption items were: 1. I am often called "absent-minded" because I get so wrapped up in what I am doing that I lose track of everything else. 2. Often when I am concentrating on something, I lose awareness of the passage of time. 3. It often seems to other people like I am in another world because I am so completely unaware of things going on around me.

⁶ These analyses combining samples can be found online.

⁷ The entire factor analysis can be viewed online.

⁸ Comparisons of the 1998 respondents to the 2005 respondents are available online.